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Measurement of Non-Life Insurance Services in the National Accounts of Israel

Prepared by the Central Bureau of Statistics of Israel

Summary

This paper describes the results of implementing the 2008 System of National Accounts (2008 SNA) recommendations for estimating output of non-life insurance (all classes of insurance except life insurance) in the national accounts of Israel.

Measuring non-life insurance output using the expectation approach can significantly improve the resultant time series of the value of services at current prices and in real terms.

Estimating output separately by class of non-life insurance gives more accurate results and allows a better distribution of output between final and intermediate consumption.

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I. Introduction

1. The rapid growth in the insurance industry over the past decade and its impact on gross domestic product (GDP) highlight the importance of the method used to measure economic activity in the insurance industry.

2. Measuring and recording the activity of non-life insurance (all classes of insurance except life insurance) in macroeconomic statistics is one of the most important areas in which 2008 SNA has brought improvements. Measuring non-life insurance output in line with the 1993 SNA recommendations, which depended on the balance of the premiums earned and the claims paid, led to unstable results. Volatility in estimating non-life insurance output had an effect on GDP and other macroeconomic indicators.

3. Under the new 2008 SNA system, changes have been made to the method for estimating non-life insurance output with a view to eliminating the volatility in estimates of output over a time series. This paper describes the results of implementing the 2008 SNA recommendations in estimating the output of non-life insurance (all classes of insurance except life insurance) in the national accounts of Israel.

II. Insurance in the national accounts

4. Insurance is defined in the system of national accounts as an economic activity aimed at providing institutional units with financial protection from various risks, such as non-life insurance covering, for instance, damage to property or health, or life insurance. Insurance services are provided on the basis of an insurance policy, which is an agreement between an insurance corporation and an institutional unit. Under the agreement, the insured unit pays a premium and, in exchange, the insurance company undertakes to settle a claim if and when an insured event occurs.

5. There are two types of insurance in the national accounts: direct insurance and reinsurance. Direct insurance is the most common, and involves an insurance company entering into an agreement with an institutional unit that does not deal with insurance. With reinsurance, the agreement is between two insurance companies, the aim being to spread the risk and protect from losses when large claims are incurred.

6. In the national accounts, direct insurance operations are divided into two types: life insurance and non-life insurance (all classes of insurance except life insurance). Despite the similarities, there are significant differences between the two types of insurance, arising from the likelihood of an insured event occurring.

7. Thus, with non-life insurance, the total premiums paid by all of the insurance company's customers are redistributed to settle the claims of customers who experience an insured event. In the case of non-life insurance, an insured event occurs with a given degree of probability, i.e., only to some of the customers.

8. With life insurance, on the other hand, the premiums paid by a specific customer are used to pay claims to that customer or to his or her heirs. This is because the insured event will definitely occur. These differences are reflected in the methods used to measure output by type of insurance in the national accounts.

9. There are several theoretical models used to measure the economic activity of insurance companies. Although there are differences, most models recognize that the purpose of the productive activity of an insurance company is to obtain maximum profit by planning the level of premiums collected from policyholders and income from investment

reserves. It bases these calculations on an estimation of the funds required to cover claims within the planning period and to establish reserves to cover future claims.

10. The guidance for the preparation of national accounts defines the output of the insurance industry as the value of services provided by insurance companies to policyholders. Since insurance companies do not, as a rule, charge their customers directly for insurance services, it is not possible to measure output directly. It is therefore proposed to estimate insurance output indirectly, on the basis of data from sources and the use of monetary funds by insurance companies.

A. Measuring non-life insurance services

11. Under the previous guidance on national accounts, 1993 SNA, the output of non-life insurance was calculated as the sum of actual premiums earned and income from investment of the reserves minus the actual payments for claims submitted and changes in the reserves. The use of this method led to sharp fluctuations in estimates of output and, in some cases, such as large-scale catastrophes, produced unreasonably low and even negative values.

12. The following question was therefore raised: is it true that, in a given year, insurance output depends on the number and size of insurance claims actually incurred during that year? After discussion of this issue by the Group of Experts on National Accounts, it was decided to alter the method used to calculate the output of non-life insurance.

13. With the new 2008 SNA, non-life insurance output is defined as the total of premiums actually earned plus income from investments (premium supplements) less adjusted claims incurred in the given period. 2008 SNA recommends three approaches for measuring output:

- The expectations approach;
- The accounting approach;
- The cost approach.

B. Measurement of non-life insurance output in real terms

14. The guidance on preparing national accounts does not give explicit recommendations for estimating the output of the insurance industry in real terms. The problem is that insurance output is measured indirectly, and it is therefore not possible to obtain a quantitative (volume) series by deflating the value of output at current prices using a price index for the product of the industry (insurance services).

15. The Group of Experts on National Accounts considered the problem of measuring non-life insurance output and proposed the following approach. A time series for the output of non-life insurance in real terms is constructed by extrapolating base period output values (at current prices) using a volume index, determined by deflating insurance premiums at current prices using a premium price index by class of insurance.

III. Measuring non-life insurance output in the National Accounts of Israel

16. In 2013, the Central Bureau of Statistics of Israel began a gradual transition to the new 2008 SNA. One of the topics selected for implementation in the first phase is improved measurement of non-life insurance output. In the past, output was measured using the recommendations of its predecessor, the 1993 SNA. This paper presents a comparative analysis of the results obtained using the recommendations of the 1993 and the 2008 systems of national accounts. The financial reports of insurance companies are used to estimate output.

A. Measuring output using the expectations approach

17. Given the available information on the activity of insurance companies, it was decided to adopt the expectations approach to estimate non-life insurance output. This approach is based on the idea that an insurance company sets the level of premiums earned, taking account of the expected income from investment of reserves, to be able to cover the payment of the expected claims.

18. In the expectations approach, the output of non-life insurance services is determined using the following formula. Actual premiums earned:

- Plus – premium supplements (expected income from investment of reserves);
- Minus – expected claims incurred.

19. Experience shows that it is not possible to obtain information on expected insurance claims and expected investment income from the insurance companies. In this case, the new national accounts guidance recommends using statistical methods to estimate the expected level of claims payments and income from reserves, based on actual data for previous years.

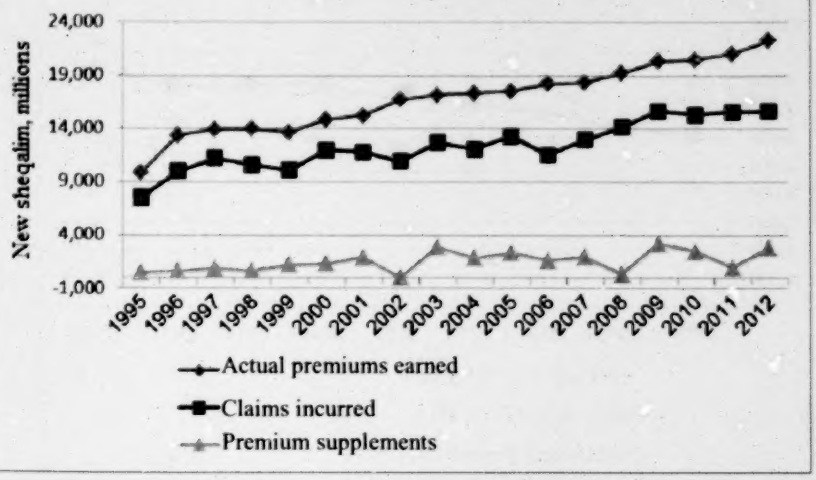
B. Measurement of overall non-life insurance output

20. In the first phase, output of non-life insurance was estimated for the whole industry, without separating the classes of insurance. Information from the consolidated financial reports of insurance companies for the period 1995–2012, compiled by the Ministry of Finance department for insurance oversight, was used to measure overall output.

21. Economic indicators of the activity of insurance companies offering non-life insurance are shown in graph 1. Note the difference observed in the behaviour of the time series shown. For example, while there is a steady rise in the "actual premiums earned" series, there are large fluctuations (rises-falls) in the "insurance claims" and "premium supplements" series. These fluctuations lead to unstable trends in the behaviour of the "non-life insurance output" time series, estimated on the basis of the previous, 1993 SNA, guidance (see graph 2).

Graph 1. Non-life insurance

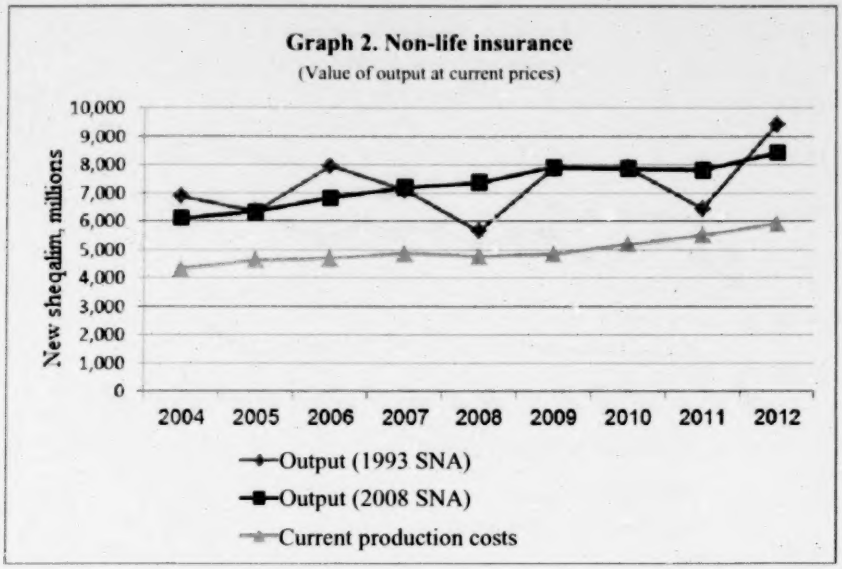
(Premiums and claims at current prices)



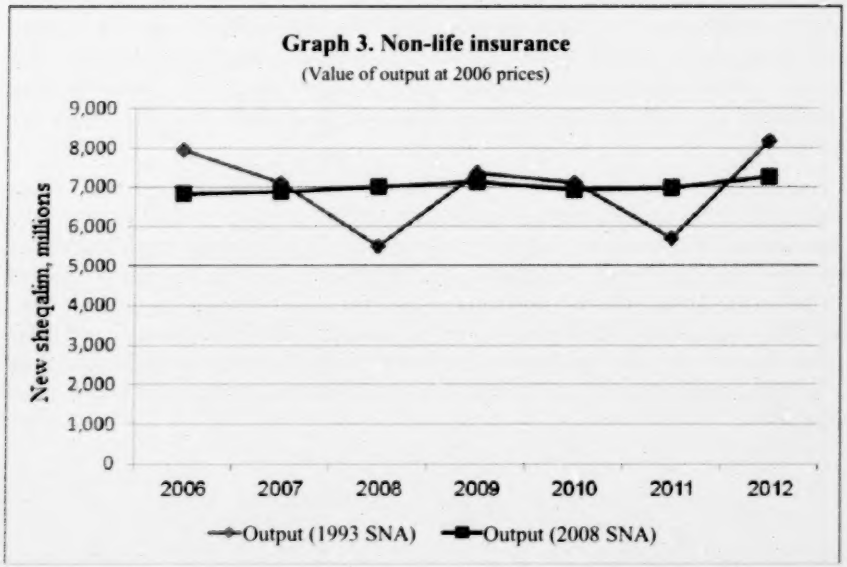
22. An adaptive model was chosen to estimate expected claims and investment income. It is assumed that the insurance company sets the expected results of its activity using a standard deviation calculated on the basis of the actual results from previous years. It was therefore decided to use the moving average method to estimate expectations.

23. Using the method chosen, adjusted claims incurred each year are estimated using a moving average of actual claims incurred over seven years (the year measured and the previous six years). The actual claims for each year are calculated as the ratio of actual claims incurred to the total of actual premiums earned over the same period. Thus, the level of expected claims over the year in question is estimated as the product of adjusted claims over total actual premiums earned in the given year. The same method is used to estimate expected income from investment of insurance reserves, or premium supplements. The value of non-life insurance output is then estimated at current prices. It is calculated using the expectations approach formula recommended in the new 2008 SNA. The results are shown in graph 2.

24. Graph 2 provides a comparison of the results of measuring non-life insurance output at current prices using the new method (2008 SNA) and the previous method (1993 SNA). The value of non-life insurance output estimated using the previous method gives an unstable time series with wide fluctuations, although the trend in the "current production costs" time series, which includes expenditure on intermediate consumption (materials and services) and wages, shows stable growth over the same period. The results obtained using the new method, on the other hand, give a stable time series that behaves in the same way as the "current production costs" series, imputed as an additional indicator of output value at current prices.



25. The output of non-life insurance at constant prices is estimated by extrapolating the output value in the base year using a volume index. To define the volume index, we deflate the "actual premiums earned" time series at current prices using a comprehensive non-life insurance premium price index. The index is calculated on the basis of premium price indices by class of non-life insurance. A comparison of the results obtained by measuring non-life insurance output at 2006 prices using the new method (2008 SNA) and the previous method (1993 SNA) is shown in graph 3. We note that the calculation using the new methodology provides more stable and logical results.



C. Measurement of non-life insurance by class of insurance

26. Measuring non-life insurance output by class of insurance makes it possible to take account of the differences between insurance products, as well as the composition of the policyholder base. This allows a more accurate distribution of non-life insurance output between final and intermediate consumption, as well as better compilation of the national accounts by sector.

27. Information from the consolidated financial report for the period 1998–2012, compiled by the Ministry of Finance department for insurance oversight, was used to estimate output by class of insurance.

28. The analysis resulted in all non-life insurance being divided into five groups:

- Compulsory vehicle insurance, i.e., insurance in the case of damage to life and health, covering all those affected by a road traffic accident: driver, passengers and pedestrians;
- Vehicle insurance, i.e., insurance against damage to property resulting from a road traffic accident, as well as in some other cases, such as theft or fire. This also includes compensation for damage to property of others caused by a third party as a result of a road traffic accident;
- Accident and health insurance, which covers claims in the event of death or disability resulting from an accident or illness, as well as medical expenses;
- Insurance of residential premises, including property within such premises, which covers damage resulting from earthquakes, flooding, fire and other natural disasters. It also covers claims for damage resulting from theft of property;
- Comprehensive insurance for business and other risks, which includes the different classes of insurance related to running a business and not included in the previous groups, such as credit insurance, professional liability insurance, cargo insurance and other risks.

29. The following table shows the distribution of premiums earned, claims, investment income (premium supplements) and current production costs by class of non-life insurance.

Table 1

Premiums, claims and current costs by class of non-life insurance

Classes of non-life insurance	*Actual premiums earned*	*Claims incurred*	*Premium supplements*	*Current production costs*
Compulsory vehicle insurance (damage to health)	22.5	28.3	62.8	13.8
Vehicle insurance (damage to property)	28.1	28.9	8.5	29.5
Accident and health insurance	15.5	12.2	4.8	21.4
Insurance of residential premises, including property	7.7	4.7	1.3	11.4
Comprehensive insurance for business and other risks	26.2	26.0	22.5	23.9
Total non-life insurance	**100.0**	**100.0**	**100.0**	**100.0**

30. There are large differences between the groups of non-life insurance classes in terms of their contribution to the various indicators for the industry as a whole compared to their share of actual premiums earned. For example, the "compulsory vehicle insurance" group accounts for a relatively high share of the industry's investment income (62.8%) and low production costs (13.8%) compared to its contribution to the actual premiums earned

(22.5%). The "accident and health insurance" group, on the other hand, accounts for a relatively low share of income from investments (4.8%) and has high current production costs (21.4%) compared to its share of premiums in the industry (15.5%). These differences emphasize the need for separate measurement and distribution of output by class of non-life insurance.

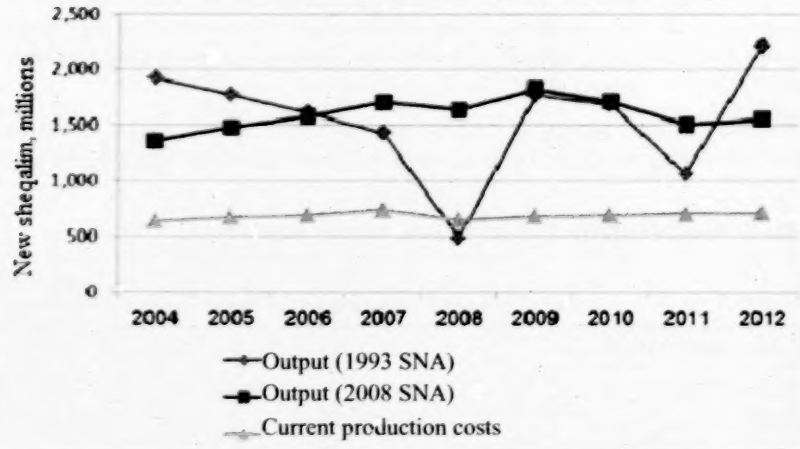
31. Output by class of non-life insurance is measured using methods similar to those used to estimate overall non-life insurance output. For example, to calculate output at current prices for each group, the level of expected claims and expected income from the investment of insurance reserves were determined using a seven-year moving average. Output at constant prices was estimated using the extrapolation method. For each group, output in the base year was extrapolated using the volume index calculated by deflating the "actual premiums earned" time series at current prices, using the insurance premium price index for the given group. Graph 5 shows the comparative results of output by class of non-life insurance in current and constant prices, produced using the previous (1993 SNA) and the new (2008 SNA) methods.

D. Compulsory vehicle insurance

32. The results of measuring the output of compulsory vehicle insurance using the new (2008 SNA) and previous (1993 SNA) methods at current and constant prices are shown in graphs 4 and 5. The volume index is estimated by deflating the "actual premiums earned" series, using the price index for compulsory vehicle insurance (section of the general consumer price index).

Graph 4. Compulsory vehicle insurance

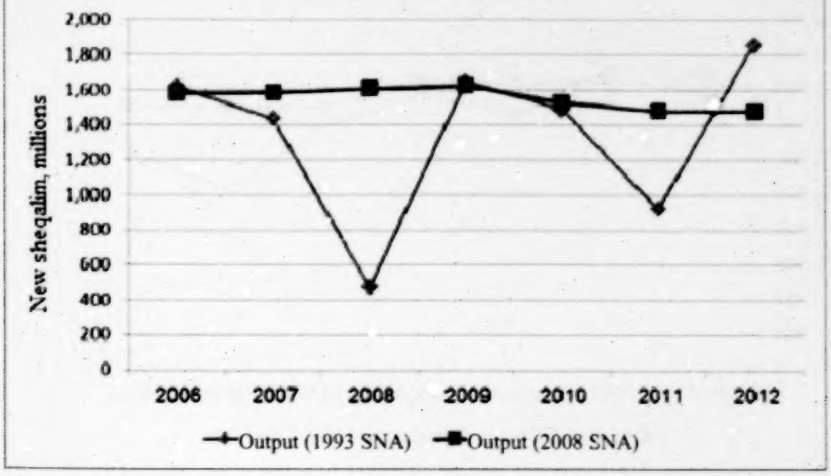
(Value of output at current prices)



33. It should be noted that, in this case, using the new approach significantly improves the results of measuring compulsory vehicle insurance output both at current and at constant prices.

Graph 5. Compulsory vehicle insurance

(Value of output at 2006 prices)



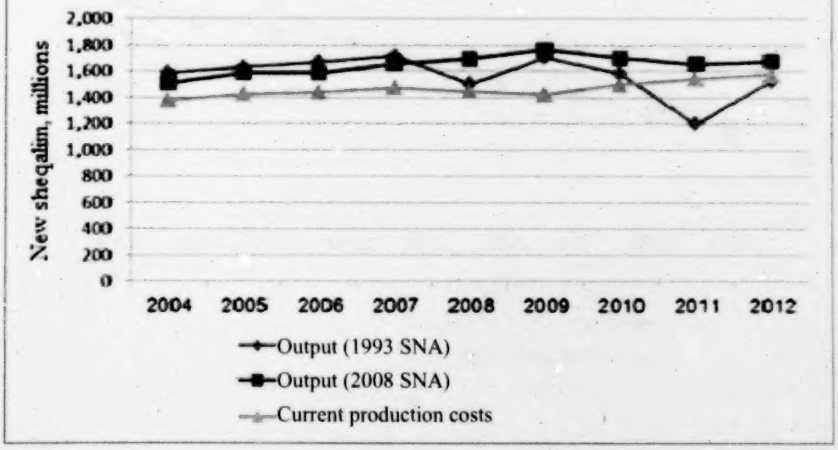
E. Vehicle insurance

34. The results of measuring vehicle insurance output using the new (2008 SNA) and previous (1993 SNA) methods in current and constant prices are shown in graphs 6 and 7. The volume index is defined by deflating the "actual premiums earned" series, using a comprehensive price index composed of price indices for vehicle insurance and insurance for damage to property of third parties as a result of a road traffic accident (section of the general consumer price index).

35. It should be noted that the new approach improves the results of measuring the output of vehicle insurance at both current and constant prices, particularly for the period 2008–2012.

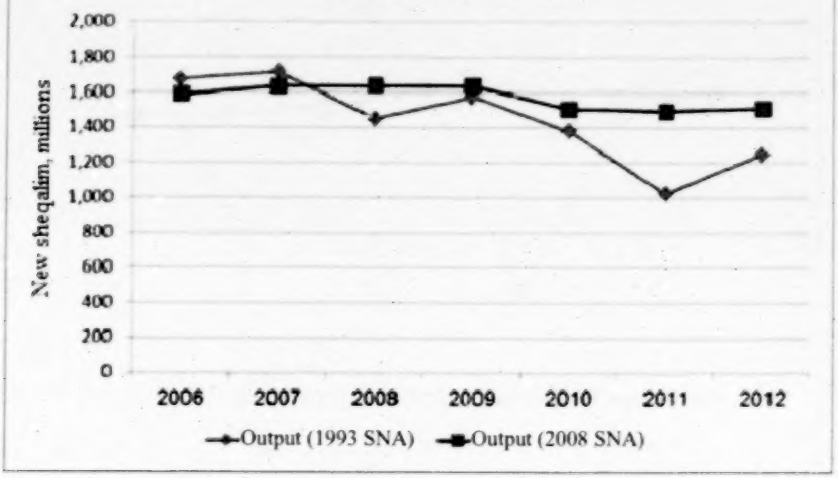
Graph 6. Vehicle insurance

(Value of output at current prices)



Graph 7. Vehicle insurance

(Value of output at 2006 prices)



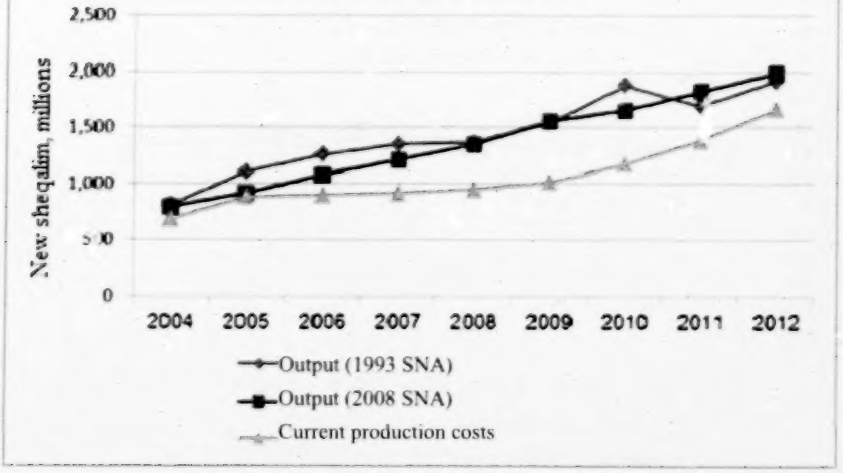
F. Accident and health insurance

36. The results of measuring accident and health insurance output using the new (2008 SNA) and previous (1993 SNA) methods at current and constant prices are shown in graphs 8 and 9. The volume index is estimated by deflating the "actual premiums earned" series, using the price index for health insurance (section of the general consumer price index).

37. The new approach improves the results of measuring accident and health insurance output at both current and constant prices.

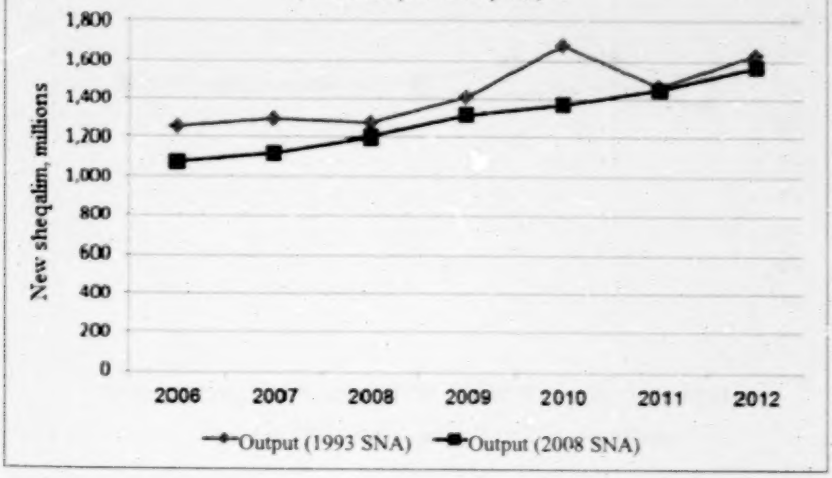
Graph 8. Accident and health insurance

(Value of output at current prices)



Graph 9. Accident and health insurance

(Value of output at 2006 prices)



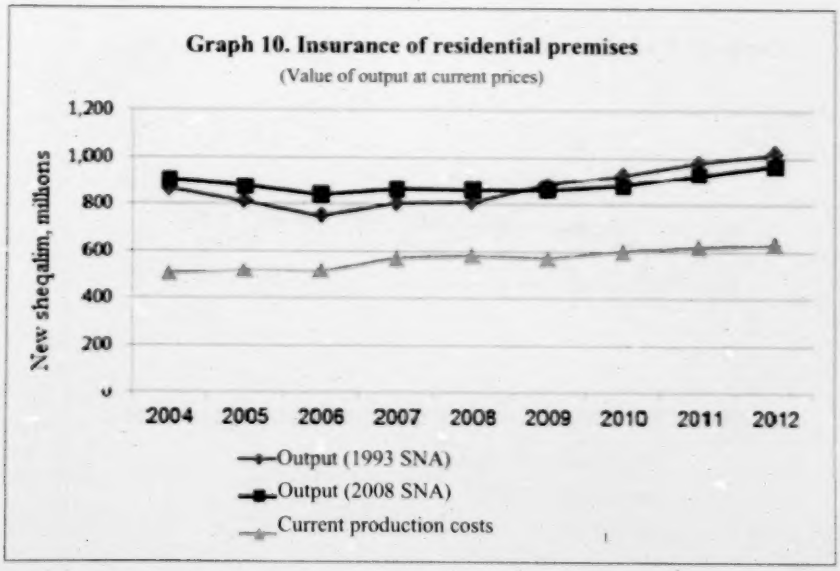
Insurance of residential premises, including property

38. The results of measuring residential premises insurance output using the new (2008 SNA) and previous (1993 SNA) methods at current and constant prices are shown in graphs 10 and 11. The volume index is estimated by deflating the "actual premiums earned" series, using the price index for insurance of residential premises and property (section of the general consumer price index).

39. In this case, we find that the improvements to the results of measuring residential premises insurance output obtained using the new approach are insignificant, both at current and at constant prices.

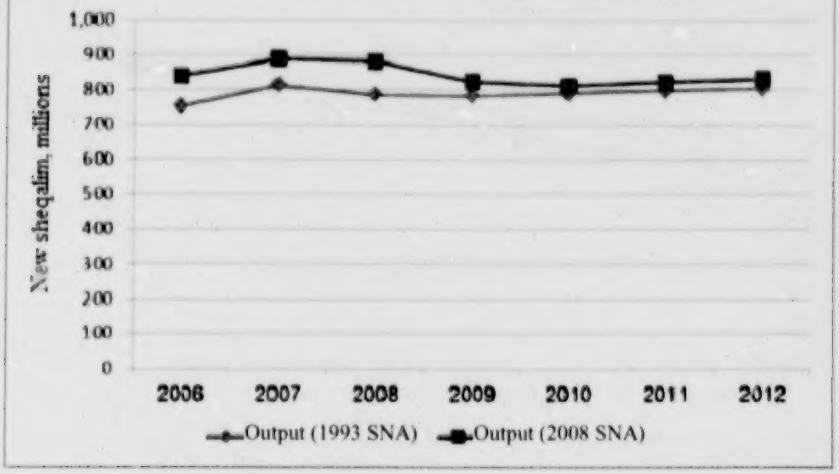
Graph 10. Insurance of residential premises

(Value of output at current prices)



Graph 11. Insurance of residential premises

(Value of output at 2006 prices)



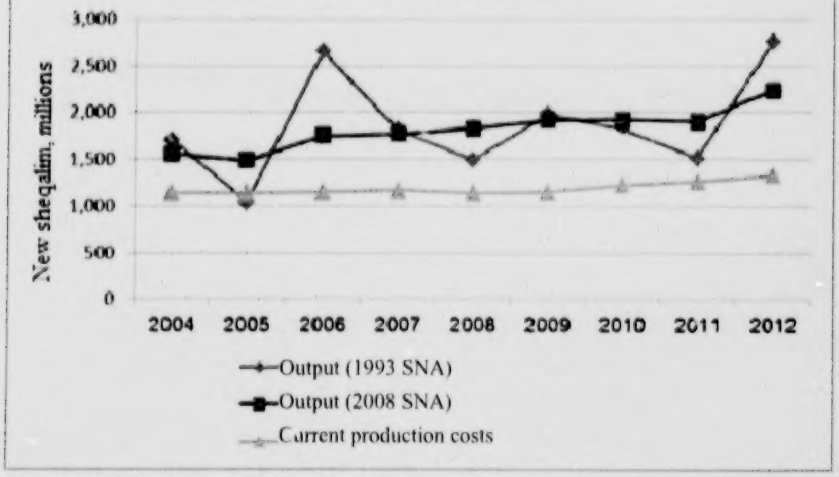
H. Comprehensive insurance for business and other risks

40. The results of measuring the output of comprehensive insurance for business and other risks using the new (2008 SNA) and previous (1993 SNA) methods at current and constant prices are shown in graphs 12 and 13. The volume index is estimated by deflating the "actual premiums earned" series, using a comprehensive price index composed of price indices by class of insurance (section of the general consumer price index).

41. Using the new approach significantly improves the results obtained from measuring the output of this group of services, both at current and at constant prices.

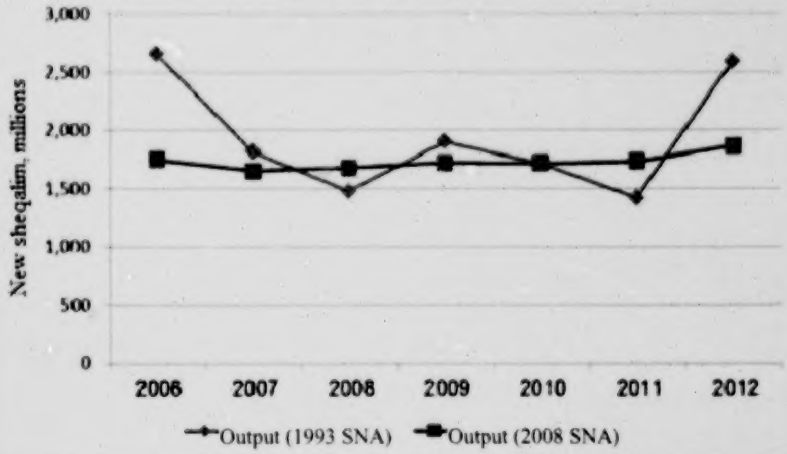
Graph 12. Comprehensive insurance for business and other risks

(Value of output at current prices)



Graph 13. Comprehensive insurance for business and other risks

(Value of output at 2006 prices)



V. Conclusion

42. Measuring the output of non-life insurance services using the expectations approach recommended in the 2008 SNA significantly improves the resultant time series for the value of services at current prices and in real terms.

43. It should be noted that measuring output separately by class of non-life insurance gives more accurate results and allows a better distribution of output between final and intermediate consumption, as well as significantly improving the compilation of national accounts by sector.